DOCUMENT RESUME

ED 476 183 TM 034 907

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TITLE	The Development of Dialogical Critical Thinking.
PUB DATE	2003-04-00
NOTE	32p.
PUB TYPE	Reports - Research (143)
EDRS PRICE	EDRS Price MF01/PC02 Plus Postage.
DESCRIPTORS	*Critical Thinking; Elementary Education; *Elementary School Students; Epistemology; Peer Relationship; Philosophy; Skill Development
IDENTIFIERS	Australia; *Dialogical Thinking; Mexico; Quebec

ABSTRACT

This study explored the manifestations of what was called "dialogical critical thinking" in elementary school students aged 10 to 12 years as they engaged in philosophical exchanges among peers. The characteristics of dialogical critical thinking and how it develops were studied over an entire school year among eight groups of students in three cultural contexts: Australia (two groups), Mexico (three groups), and Quebec (Canada) (three groups). Each group contained, on average, 30 students. Findings were constructed in an inductive manner, inspired by qualitative analysis as defined by Glaser and Strauss (1967). From the analysis, a grid was developed to illustrate the process by which dialogical critical thinking developed among these students. This process is manifested through four modes of thinking (logical, creative, responsible, and metacognitive), which become increasingly complex according to three epistemological perspectives (egocentricity, relativism, and intersubjectivity oriented toward meaning). (Contains 34 references.) (Author/SLD)

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THE DEVELOPMENT OF DIALOGICAL CRITICAL THINKING

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THE DEVELOPMENT OF DIALOGICAL CRITICAL THINKING

Abstract

In this paper, we study the manifestations of what we call "dialogical critical thinking" in elementary school pupils while they are engaging in philosophical exchanges among peers: What are the characteristics of dialogical critical thinking? How does it develop in youngsters? Our research was conducted during an entire school year among eight groups of pupils arising from three cultural contexts: Australia, Mexico and Quebec. Our findings were constructed in an inductive manner, inspired by qualitative analysis as defined by Glaser and Strauss (1967). From our analysis, a grid was developed, illustrating the process by which dialogical critical thinking develops among the pupils involved in our research. This process is manifested via four modes of thinking (logical, creative, responsible and meta-cognitive), which become increasingly complex according to three epistemological perspectives (egocentricity, relativism and inter-subjectivity oriented toward meaning).

Key words

Critical thinking

Dialogue

10-12 years old pupils

THE DEVELOPMENT OF DIALOGICAL CRITICAL THINKING

In Australia, Canada, Mexico, and of course elsewhere in the world, education is becoming more and more problematic, in that the 21st Century will likely be shaped by three prominent tendencies: globalization and world-wide application, the explosion of knowledge and the accelerated development of technologies, and the increasing complexity of life in society (Delors, 1996). In the future, schools must provide younger generations with a form of education that will allow them to successfully meet these new challenges (Pallascio, Lafortune, Allaire, Mongeau, 1997; Splitter and Sharp, 1995).

In this respect, the development of critical thinking among pupils is an initial factor which suggests itself more and more insistently to the work groups investigating these matters, among others, the International Commission on Education for the 21st Century, presented at UNESCO (Delors, 1996). According to the Commission, the development of critical thinking in pupils is becoming essential "in order to favour a true comprehension of events among pupils instead of developing and maintaining a simplifying vision of the information connected to these events." (1996, p. 47). Secondly, the UNESCO Report on Education proposes that schools "value cooperation" among youngsters. It thus appears that the UNESCO Report refers to a definition of critical thinking that is cooperative in its essence. Critical thinking is seen not as a technique to be applied, but as a global process (Daniel and Schleifer, 1996; Slade, 1996). We call critical thinking in this sense "dialogical critical thinking".

Although critical thinking is valued almost universally, there exists no consensus as to its definition. When linked to cooperative behaviours and attitudes, critical thinking becomes even more complex to define and to operationalize. The objective of our experimentation was to study the manifestations of dialogical critical thinking in elementary school pupils. What are the characteristics of dialogical critical thinking? How does it develop in youngsters? What thinking modes are active when youngsters aged 10 to 12 years engage in a philosophical dialogue among their peers? There is currently little empirical data on this topic.

In order to achieve our research objective, we opted to develop a substantive (vs. formal) theory as to how this development unfolds, which is primarily based on the spoken words of youngsters aged 10 to 12 years old.

In this paper, we introduce a grid illustrating the development of dialogical critical thinking among Australian, Mexican and Quebec pupils while they are engaging in philosophical exchanges. The grid represents the manifestations of four modes of thinking among youngsters aged 10 to 12 years, and highlights the increasing complexity of the thinking associated with these modes, which is connected to the youngsters' epistemological perspectives. Categorization of youngsters' dialogical critical thinking according to observable characteristics affords both a conceptual and a pedagogical advantage: a better understanding of the development of dialogical critical thinking in youngsters, and an improved ability among teachers to work more systematically to develop this type of thinking in their pupils.

Background

While we did not rely on specific theories as the basis for our analyses, some elements of definition proposed by Ennis (1987; 1991;1993), Lipman (1988; 1991; 1995),

McPeck (1994), Paul (1987; 1993) and Siegel (1988) likely influenced the process of our analysis. But these definitions apply mainly to young adults' cognitive skills and attitudes, while we are interested in critical thinking as it manifests itself in elementary schools pupils while they engage in philosophical discussions. Also, their process of analysis is essentially theoretical, while ours is grounded in actual classroom observation. Finally, our attention focuses on "dialogical critical thinking", from UNESCO' s perspective, which we consider to be more complex than ordinary "critical thinking".

With regard to epistemological perspectives, there are remarkably consistent relationships between people's beliefs relating to their ways of knowing, and the justifications they use to support their beliefs (which is what is fostered by critical dialogue among youths). Indeed, in both of these mental operations, organization of the cognitive network and the inherent internal logic must be similar. For example, if a child possesses a single category according to which to classify her or his knowledge (e.g.: when knowledge is based on direct observation), it will be impossible for the child to justify these beliefs by referring to the probability that a point of view relating to a situation is more exact than another (abstraction and reasoning). This child will justify these beliefs by referring to what is concrete and real in her or his observations. In this view, epistemology is a complementary instrument that allows us to better comprehend the cognitive process of the pupils when they are engaged in dialogical critical thinking.

Works by Perry (1970), King and Kitchener (1994) and others were a source of inspiration. Nevertheless, these works concentrate on young adults in college and university settings, while we are concerned with 10-12 year-olds in elementary schools. Their methodological approach was concerned with self-report questionnaires and open interviews,

while we prefer an approach that allows the epistemological perspectives to emerge from spontaneous philosophical discussions among peers.

Methodology

This research project was subsidized by the Social Sciences and Humanities Research Council of Canada (SSHRC) (1998-2002). Its goal is to describe pupils' realities with regard to dialogical critical thinking. The findings were constructed in an inductive manner, inspired by qualitative analysis as defined by Huberman and Miles (1991) and Glaser and Strauss (1967).

The research project was conducted in three distinct cultural contexts: Australia, Mexico and Quebec. Three groups of pupils were studied in Mexico, three groups in Quebec and two groups in Australia, for a total of eight groups of pupils. Among these, two groups consisted of pupils who were experienced in the Philosophy for Children (P4C) approach, whereas pupils in the other groups were not. Each group included on average 30 pupils. The pupils were aged 10 to 12 years, and were attending elementary schools (grades 5 and 6).

The experimentation took place throughout an entire school year. Different socio-economic backgrounds were represented (4 privileged and semi-privileged; 3 underprivileged; 1 extremely poor). Experimentation was conducted in the pupils' classroom for one hour per week, from the beginning to the end of the school year. The approach used to stimulate the complex thinking we wished to observe was P4C adapted to mathematics (P4CM) (Authors, 1996). In each classroom, three video recordings were produced of the exchanges among pupils as they were experiencing a P4CM session (one at the very beginning of the school year, another at midyear, and the last at the very end of the school year), for a total of 24 recordings. A professional cameraman using two cameras produced the recordings.

The recordings were then transcribed in the original languages of the pupils (English, Spanish and French). This enabled the Mexican, Australian and Quebec researchers to analyze the transcripts in their own mother tongues, ensuring enhanced comprehension and a reduced margin of analysis error. To ensure cohesion and consistency, the Head of Research first analyzed all of the transcripts; then some six weeks later, all transcripts were again subjected to a blind analysis by the same researcher; finally, each transcript was analyzed by at least one other team co-researcher. In instances where the researchers were in disagreement, they exchanged views until a consensus was reached.

One of the objectives of the research project was to describe the development of the dialogical critical thinking process in pupils aged 10 to 12 years. To do this, we first analyzed the 24 transcripts from the Australian, Mexican and Quebec groups in order to categorize the exchanges into three types: anecdotal, monological and dialogical[1]. The analysis referred to explicit content, that is, content which was present in the pupils' discourse, and not content deduced by the researchers. We then distinguished non-critical from semi-critical and critical dialogue[2]. We thus had an ongoing portrait of the evolution of exchanges from the beginning to the end of the school year.

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1 Briefly, an anecdotal exchange is an exchange in which pupils are not concerned with peers' points of view. Each pupil is motivated to tell whatever anecdotes occur to her or him. A monological exchange is one in which the pupils conduct a monologue with themselves in relation to a question that the group chose to discuss. Although exchanging ideas on the same problem, each pupil pursues his or her own idea, without letting peers' perspectives influence their own. A dialogical exchange, on the other hand, presupposes certain listening skills on the part of the pupils, as well as active participation in the exchange. A dialogical exchange is characterized by interdependence of viewpoints, respect for the principle of continuity when elaborating perspectives, and the enrichment of the initial idea (Daniel and Pallascio, 1997).

[2]In summary, non-critical dialogue is dialogue as understood in the preceding note, but it remains simple; i.e.: without nuances and, most of all, without modification of the initial idea. Semi-critical dialogue is evaluative; it therefore contains some criticism, but the criticisms are not echoed to any extent in the evolution of the pupils' perspectives; in semi-critical dialogue, the pupils seem to dialogue in order to talk (which is the first step) more than to think (which is our goal). Critical dialogue presupposes a decentering of one's own perspectives, an evaluation of viewpoints and an open-mindedness toward others, such that the discussion's initial idea is not merely enriched, but modified (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002).

A second analysis of the transcripts (that under discussion in this research paper), based on the first, was conducted in relation to the cognitive evolution of the pupils as manifested in each type of exchange. A) We analyzed each pupil's interventions to determine the principle cognitive skills involved (justification, definition, example, etc.); then we grouped these interventions into temporary categories (logical, creative, responsible, meta-cognitive), according to their relationships with the cognitive modes. A general definition which serves as a model was then attributed to each of these thinking modes. B) We again analyzed the same transcripts of pupil exchanges, with particular attention to the manner in which thinking modes became more complex as the exchanges among pupils progressed. This led us to identify three epistemological perspectives (egocentricity, relativism, and inter-subjectivity oriented toward meanings); a fourth perspective was theoretically inferred (inter-subjectivity oriented toward knowledge). We then had all of the elements required to produce a grid illustrating the development of dialogical critical thinking in the pupils.

Furthermore, we noted that many pupils' statements could be simultaneously complex in content, and yet simple in form. For example, a pupil intervention might deal with abstract concepts, but without, however, offering any justification to support premises. Thus, we made a distinction between the content and the form of the discourse, separating the grid into two sections. The grid parameters remained temporary until all transcripts had been analyzed; it was continuously adjusted as we progressed through the analysis of the transcripts.

A Grid Describing Dialogical Critical Thinking: Where it Comes from and Where it Leads

First we present the grid. In it, elements in bold type reflect manifestations of thought when the exchange among pupils is of a dialogical critical type (taking into consideration that

discourse is the manifestation of thought, we then speak of dialogical critical thinking). Elements in regular type indicate the pupils' progression prior to reaching the dialogical critical thinking stage. Italics indicate elements that did not appear in the transcripts, but which were inferred by the researchers.

Second, we define the main concepts in the grid (for a visual reference to accompany the theoretical description, please refer to the illustration of the grid). To do so, we describe the epistemological perspectives as they are manifested in the pupils' transcripts. Then, we explain each of the cognitive modes in relation to each mode's epistemological perspectives : a) with regard to content, and b) with regard to form. Thus we describe the grid from the top down, in order to understand how each thinking mode develops in the pupils.

Development of the Dialogical Critical Thinking Process - Content

Perspective	Logical	Creative	Responsible	Meta-cognitive
1 Egocentricity (monism)	Statement based on sensory observation of a personal and particular fact	Statement that gives meaning to a personal point of view	Response related to one's own behaviour	Statement related to one's own point of view, task, skill, etc.
2 Relativism	Statement based on a generalization stemming from senses and reason	Statement that gives meaning to another's viewpoint	Response related to a peer's particular behaviour	Statement related to peers' points of view, tasks, skills, strategies, etc. ("I agree with...")
3 Inter-subjectivity (oriented toward meaning)	**Statement based on simple reasoning (conceptualization)**	**Statement that brings forth a divergent meaning (transformation)**	**Response related to moral rules (categorization)**	**Statement expressing a change of perspective (correction)**
4 Inter-subjectivity (oriented toward constructed knowledge)	*Statement based on complex and open reasoning*	*Statement that presents or relates various meanings*	*Response related to ethical principles*	*Statement acknowledging an enrichment of perspective via the group discussion*

Development of the Dialogical Critical Thinking Process - Form

Perspective	Logical	Creative	Responsible	Meta-cognitive
1 Egocentricity (monism)	Unjustified statement	Statement of meaning (units)	Statement of response in relation to behaviour, rules, etc.	Statement of a task, skill, strategy, etc.
2 Relativism	Justification (incomplete or concrete) induced by the teacher	Contextualization of meaning (simple relations)	Attempt to understand behaviours, rules, etc.	Description of the task, skill, strategy, etc.
3 Inter-subjectivity (oriented toward meaning)	**Spontaneous justification ("...because...")**	**Evaluation of meaning (critical relations)**	**Manifestation of doubts about behaviours, rules or principles**	**Explanation of the task, skill, strategy, etc.**
4 Inter-subjectivity (oriented toward constructed knowledge)	*Argument (if...therefore)*	*Reflection on meanings to improve or transform them (complex relations)*	*Engagement in stimulating the group toward change*	*Argumentation about the task, skill, strategy, etc.*

Epistemological Perspectives

In order to better understand the development of thinking in youths, we attempted to connect the increasing complexity that emerged in the analysis of the transcripts of exchanges to epistemological perspectives.

The analysis of certain transcripts, reflecting exchanges of a monological type among pupils (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002), revealed, among other elements, the presence of the following characteristics: The exchange was not characterized by questioning. The pupils did not manifest any curiosity toward or interest in the ideas of their peers; diverging viewpoints seemed to confuse rather than enrich them. Each intervention was stated as though it were *a priori* solid and viable, because it was largely supported by sensory observation. Even when the teacher prompts them to justify their opinions, the pupils do not offer any justification to support their statements. Points of view that lie within different frames of reference seem to be left unheard, in that the ideas of one are not taken up in the elaboration of the others' viewpoints; consequently, the discussion neither enriches nor furthers the pupils' comprehension. These elements were particularly manifested during the first recording, and in the groups in which the pupils did not have any experience with the P4C approach.

We have linked these elements to the first epistemological perspective, which we call egocentricity, and which we define as an absence: the absence of others' perspectives; absence of need to reason and evaluate; absence of need to discuss. Egocentricity is an epistemological perspective in which the pupil is the center of everything, and in which his perceptual experience constitutes the best means to access the world. "Truth" exists in the singular form, and is found in the concrete. Lack of open-mindedness toward others' perspectives is its corollary, and the consequence is that an exchange among peers does not enrich the individual. Although personal

experience is important for comprehension of the world, it is not sufficient to contribute to the improvement of experience (individual and social). Egocentricity is therefore the simplest epistemological perspective (perspective 1).

Analysis of other transcripts (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002) showed the following elements: the pupils pronounce viewpoints or criteria that are not evaluated by their peers, as if they were all equally reliable, viable and solid. The exchange among pupils denotes decentering in relation to the object and in relation to self; beliefs become not singular, but plural in form; "truth" is modifiable according to context; each person has a point of view of their own; pupil justification is not necessary; it requires the teacher's stimulation to occur. When it occurs, it indicates a capacity to link the senses' concrete observations to abstractions in the form of reasoning. Also, the sole objective of justification seems to be to prove that one's opinion is better than those of one's peers. This perspective is the most representative of the majority of exchanges we analyzed. It therefore best represents groups of average pupils aged 10 to 12 years when they begin engaging in philosophical discussions among peers. These discussions are dialogical, but non-critical or semi-critical. Because of its particular characteristics, where reasoning is present but where lack of criticism is manifest, we have called this perspective relativism (perspective 2).

In relativism, all opinions are equally valid, in that they point back only to the pupils stating them, rather than to criteria, norms or reasons that could organize them into a hierarchy. Consequently, the pupils never discover any problems or flaws in discussion: the *status quo* reigns, and it is the quantity (vs. the quality) of statements, beliefs, meanings and so on, that ensures the discussion's richness. Tolerance, as practiced in this context, works against

improvement of the pupils' conceptual network, in that it does not participate in its redefinition. In this perspective, we cannot yet speak of "inquiry" (Dewey, 1929/1960; Rorty, 1991).

The passage from egocentricity into relativism seems to develop, initially, through a coexistence of both perspectives. Indeed, we have observed that two epistemological perspectives can coexist in an exchange, just as an exchange can be at times dialogical and at other times monological. This duality of perspectives is found, on one hand, when a group of pupils is not yet anchored in a perspective, but is wavering from one to the other according to the content of the statements being discussed, and, on the other hand, when certain pupils in the group share a perspective while others adhere to a different one. In the latter case, the pupils are their peers' first educators: whereas some convey more open epistemological beliefs, by their questions, they prompt other, more egocentric pupils to widen their horizons and move toward more reflexive judgment.

Finally, analysis of other transcripts (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002) showed an additional epistemological perspective among youngsters engaging in critical dialogue: inter-subjectivity oriented toward meaning (perspective 3). In this perspective, the pupils have integrated conceptualization, transformation, categorization and correction. They have also integrated the operational mode of philosophical discussion among peers in order to form a "community of inquiry" (Splitter and Sharp, 1995). The justifications they provide originate in reasoning and reflection. Their statements are more often manifested as hypotheses than as conclusions; thus, knowledge on an individual basis seems uncertain and, as such, develops from the groups' diversified viewpoints. Evaluation and criticism are frequent, and manifest themselves in different ways (nuances, counter-examples, questions, oppositions, etc.); criticism is not competitive, but is elaborated in a cooperative manner. The pupils seem to

be aware that their points of view are temporary, and that dialogue is an open process that is subject to evaluation and revision. However, critical evaluation has its limits, since it arises more from pupils' experience and reasoning than from theoretical knowledge, which is limited at this age. Due to this limitation, the reconstruction in which they are participating seems to be oriented toward their own comprehension of the world (search for meaning). We have called this epistemological perspective inter-subjectivity oriented toward meaning. As with the preceding epistemological perspectives, inter-subjectivity gradually appears in a group, which is to say that certain pupils posses a relativistic perspective, whereas others are already anchored in inter-subjectivity.

From the preceding analysis, we infer that the fourth epistemological perspective (which was not manifested in the groups of pupils studied) could also be anchored in inter-subjectivity, except that this would in this case be oriented toward knowledge (perspective 4). Knowledge is not seen here as an *en-soi* to be transmitted, but as a social construction, integrated in a particular context, and open to refinement; likewise with theories which are perceived not as truths, but as models approximately reflecting the world. At this level of complexity, personal experience and theoretical knowledge (external) are inter-related and empower the individual to actively contribute to the improvement of the social experience. We consider that a discussion between professional adults who are experts in a discipline could reflect this level in which all ideas would *a priori* be considered deficient, requiring examination in a critical manner.

Thinking Modes: a) Content

From the analysis of the pupils' transcripts, dialogical critical thinking appears to be multi-modal. The four modes of thinking that emerged are: logical, creative, responsible, and meta-cognitive.

Logical Thinking

In the transcripts, logical thinking does not emerge as traditional formal logic (a discipline that studies only the form with a view to determining which forms of reason are correct and which are not, setting aside the matter of thought, that is to say, the object it refers to). Logical thinking refers rather to informal reasoning, which presupposes coherence in language and in action. Pupils manifest logical thinking by searching for criteria, giving good reasons, inferring, judging, synthesizing, explaining, defining, reasoning, etc.

From what we observed in the transcripts, perspective 1 of logical thinking is the simplest of them all. It develops with regard to perceptual experience; perceptions and concrete objects are the pupil's only possible references; reasoning is not taken into account. In this perspective, the pupils do not know they have opinions of their own, and that these opinions may differ from those of the adults who teach them. Therefore, they do not elaborate points of view, but rather provide the teacher with answers that are simple and brief. Study of the transcripts reveals that perspective 1 of logical thinking generally corresponds to a monological exchange. The correspondence to the first epistemological perspective, egocentricity, is justified by the fact that perceptual experience is so validated by reality that observing and taking note are sufficient. Then, since observation concerns a particular and personal fact, it is the pupil's own perspective that is active as a whole and becomes representative of the whole, which precludes any possibility of plurality. Egocentricity is monist in its search for a single truth.

In our transcripts, perspective 2 of logical thinking implies both observation and reasoning; this perspective was encountered frequently (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002). The pupils try to distance themselves from the object they speak about, but the object remains the ultimate reference that guides them in their generalizations. In the analysis, we noted that perspective 2 of logical thinking generally corresponds to a dialogical but non-critical exchange among pupils, which presupposes an attention to peer statements, but without any evaluation, and without questioning the peers' premises. The exchange is reduced to a rather lax juxtaposition of peer statements. This is normal, since in this perspective, pupils begin to realize that they can construct their own judgments and present original points of view. They do so abundantly, and let their peers express themselves just as much. They do not yet know that it is valuable to criticize the premises and criteria, since some are more solid, or more viable, or more relevant, or more significant than others. It is also within this perspective that logical thinking is associated with relativism. Pupils experience the pleasures of sharing, with a nascent awareness of diversity; pupils enjoy expressing themselves and accumulating points of view, as though enrichment comes from addition; this new pleasure leaves little room for the discipline and rigour required for the systematic criticism of alternative viewpoints. This is especially true since, within any group, not all pupils evolve at the same rate, and thus the egocentricity of some makes it difficult to exploit relativism to its utmost.

Perspective 3 of logical thinking is related to conceptualization; pupils do not need concrete support, nor do they have to resort to perceptual experience, either to understand what is being discussed during the exchange, or to be understood by others. When pupils are able to conceptualize and reason, they are able to understand each other's perspectives no matter how different from their own. The analysis showed that groups who attained the third perspective of

logical thinking were capable of critical dialogue (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002), which is to say that they had the necessary cognitive and epistemological means to evaluate their points of view and those of their peers. As the P4C approach regularly stimulates the children to react, to nuance, to specify, to find counter-examples, and so on, it gradually leads them to understand that the conclusions they formulate are rarely permanent, that people (even adults) are prone to making mistakes, and that enrichment is based on error.

Perspective 4 of logical thinking was not manifested directly in the groups we studied. The concept as presented in the grid is a simple theoretical extrapolation which we present as follows: the use of complex arguments would be based on organization of a series of simple and open arguments, which in itself would constitute a single complex argument. Furthermore, we consider that theoretical (constructed) knowledge for which there is a certain general assent would support the argument's credibility. The underlying epistemology would no longer be inter-subjectivity oriented toward the construction of meaning, but rather toward the elaboration of constructed knowledge.

Creative Thinking

Among pupils aged 10 to 12 years, creative thinking appears to find its roots in constructing and transforming meaning; it is manifest in the production of new relationships between pre-existing units which surprise one's peers and enrich the discussion, in original and divergent interpretations of meaning, etc. The most frequent manifestations of creative thinking are: giving an example, giving a counter-example, questioning, proposing a solution, creating new relationships, providing context, inventing a problem, etc.

In the transcripts we analyzed, the process of constructing meaning first manifested itself in the creation of examples to illustrate pupils' own viewpoints (perspective 1). This seemed to be a spontaneous reaction by the pupils, that is, they were naturally inclined to provide examples when presenting their viewpoints.

However, searching for meaning in peer statements and illustrating peer points of view with examples (perspective 2) appeared later on in the school year, or only among pupils experienced in P4C. We explain this fact by citing the difficulty posed by decentering with respect to their own perspectives, which requires finding an example to give meaning to others' viewpoints. Egocentricity is then surpassed, and since meaning is found not only in oneself, but also in the other, this step illustrates the subjectivity of perspective: Each person, being a subject, is entitled to produce meaning. Furthermore, although the example is generally a tangible realization that is a product of a youngster's experience, its formulation presupposes that the pupil has established relevant and adequate relationships. This corresponds to a certain level of abstraction. Perspective 1 of creative thinking therefore falls within the scope of egocentricity, and perspective 2, within the scope of relativism. In the transcripts we studied (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002), we observed a greater frequency of creative thinking from perspective 2 in the non-critical dialogues.

Perspective 3 of creative thinking is shown through greater creativity, which is to say through divergence, the unexpected, and the surprising. We observed these manifestations in the transcripts when pupils were engaged in critical dialogue and surprised their peers by transforming the path of the exchange, bringing forth a different meaning or a diverging point of view which both prompted the group to reflect and invited justification (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002). There is a close relationship between creative thinking

within perspective 3 and critical dialogue. Indeed, at this level, creative thinking is divergent, and as such, it provokes cognitive dissonance in peers' minds. This cognitive disequilibrium is the state of discomfort felt by a pupil when certainty with regard to knowledge is replaced by doubt. From then on, the pupil no longer feels like a passive receptor, but personally engages in a process of construction of meaning in order to recreate a state of security. Cognitive dissonance is therefore responsible for the state of uncertainty, which predisposes the pupil to temporarily engage in a complex reflective process. This correspond to what we have called inter-subjectivity.

Perspective 4 of creative thinking stems from a simple theoretical extrapolation; it does not emerge directly from the transcripts studied. Perspective 4 could imply the ability to understand, organize and relate various meanings and various levels. Within perspective 3, the pupils react to one meaning at a time; within perspective 4, the process should gain in complexity, and pupils should be able to deal with many meanings at the same time, not only in order to give meaning to the statements, but also to construct more significant knowledge.

Responsible Thinking

Responsible thinking is different from caring thinking (Lipman, 1991; Noddings 1984). As observed in the transcripts, responsible thinking starts with doubt and leads to exploration, reflection and the improvement of behaviour. It implies a personal responsibility toward the consequences of one's actions, as well as getting involved. It means reciprocity. Responsible thinking is manifest when pupils evaluate their behaviour or their society, reflect about consequences, and are aware of moral rules and ethical principles.

In the transcripts we studied, statements by pupils which took into consideration only pupils' own behaviour and ignored peers' behaviours (perspective 1) were observed in the first exchanges of the school year among pupils who had no experience with P4C. These exchanges were described as monological (Daniel, Splitter, Slade, Lafortune, Pallascio, Mongeau, 2002), as they reflect an egocentric epistemological perspective, in that the non-recognition of others' perspectives presupposes monism with regard to one's own personal truth.

It is when the group is capable of dialogue (in the transcripts, non-critical dialogue) that the manifestations of perspective 2 appear, and that the pupils become aware of the difference between their own attitudes and behaviours and those of their peers; they then react to others, but with a relativist acceptance: differences are noted, but not evaluated, each has good reasons to act, or to be, the way they are. This confirms the correspondence to the epistemological perspective of relativism.

As displayed in the transcripts, perspective 3 shows that pupils compare behaviour (their own or that of others) with the moral rules in common practice. The content of a statement explicitly identifies the rules which have or have not been respected; thus, categorization (of particular acts into groups of rules) is performed and criticism is initiated in the dialogue. This type of response reflects inter-subjectivity, in that the evaluation of behaviour is necessarily based on criteria, and, when this evaluation is criticized, it presupposes the criteria's temporality and it situates them in an open process. Also, at this level of complexity, pupils' responses appear to be attempts to grasp the meaning of the rules, to understand how their society functions, etc. They do not seem to be in the process of constructing knowledge, but in the process of searching for meaning.

Perspective 4 was not explicitly manifested in the transcripts we studied, but we extrapolated it from the previous perspectives: If we consider the greater abstraction and complexity of thinking and preoccupation, it follows that we arrive at reflection on, and reflection using, ethical principles. This being the case, the thinking process would reflect the use of ethical (constructed) theories as a starting point, in order to explain the causes and consequences of human behaviour, as well as to improve knowledge of this behaviour.

Meta-cognitive Thinking

In the context of the transcripts, meta-cognitive thinking means reflecting about one's (self's or others') thoughts, rather than simply talking for the sake of talking; it means exercising some control over these thoughts and over the direction of discussion. In dialogue, meta-cognitive thinking appears when pupils explicitly mention a peer contribution; are open to peers' thinking skills; use peers' perspectives to modify their own; correct and self-correct, etc.

The simplest level reflects an egocentric epistemological perspective: excessive centering on ones' own viewpoints and unawareness of others' views shows an epistemological incapacity to listen, understand, and accept perspectives that differ from one's own.

The increasing complexity of perspectives of meta-cognitive thinking progressively leans toward relativism. Perspective 2 emerged most in the groups we studied when the pupils were engaged in dialogue which varied from non-critical to semi-critical. The expression "I agree with...", which most strongly reflected this level, presupposes that the pupils listen and understand their peers, and that they acknowledge each other's points of view. All ideas are accepted with great open-mindedness, even generosity, to the point that the pleasure derived from linking one's statements to those of one's peers becomes a habit which, while good in

itself, disregards the main objective of the community of inquiry, which is modification (improvement) of the initial idea. In sum, perspective 2 of meta-cognitive thinking reflects the relativism that is strongly manifested in this cognitive mode among pupils.

As seen in the transcripts, correction (perspective 3) is characteristic of critical dialogue. Correction implies a process of conscious reflection in the group; it presupposes that the pupils compare the initial perspective with the justification for an alternative perspective, and that they consider the new one to be more relevant, more significant, valid, solid, etc., than the initial one. Correction, or group correction, involves a cognitive process that leans toward inter-subjectivity of perspective, since at this level, pupils are engaged in a community of inquiry. In other words, pupils know that a diversity of perspectives contributes to the enrichment of the group, that peer criticism is a positive recognition of what is criticized, and that recognition of error is a sign of the evolution of perspective (Daniel, Lafortune, Pallascio, Schleifer, 2000).

We estimate that the fourth perspective to attain could be acknowledgment of the enrichment of knowledge or perspective via the group discussion. However, the pupils did not verbalize this, so the existence of this perspective is still a theoretical extrapolation that remains to be studied.

Thinking Modes: b) Form

Logical Thinking

With regard to form, logical thinking first supposes a simple, unjustified statement (perspective 1). Indeed, egocentric pupils consider that their perspective is the only one that exists, and thus that it does not require any justification; observation of reality is sufficient in

itself. Even when the teacher asks these pupils to justify their points of view, they are incapable of finding a valid reason on which to base their opinions.

The transcripts revealed that, from perspective 2, the pupils justify their points of view to the extent that they are prompted to do so by the teacher. And in such a case, the justification on which they base their statement is simple ("...it is so because..."). This way of proceeding is anchored in relativism: from this perspective, all viewpoints being equally pertinent and acceptable, the need to justify them does not yet represent a necessity to the pupils, although, cognitively speaking, they are apt to do so.

Perspective 3 is marked by justifications that are simple ("...because..."), but which spontaneously arise to support the pupils' statements, as though presenting the basis of their beliefs to their peers is basic. From this perspective, pupils seem aware of the plurality of viewpoints, of the possibility that their peers will evaluate their statements, and therefore they feel the need to explain their validity to their peers. Perspective 3 reflects inter-subjectivity with regard to its increasing complexity.

In the transcripts, argumentation ("...if...therefore...") (perspective 4), which requires a higher level of abstraction, never characterized any entire group. Some individuals formulated explicit argumentation, but these incidents of argumentation remained isolated. We estimate that, with the formulation of arguments in good and due form, the pupils could proceed to the formal construction of knowledge and attain perspective 4.

Creative Thinking

The transcripts show that it is easy for the pupils to state a unit of meaning (perspective 1) that is simple (e.g.: through example) or complex (e.g.: through a counter-

example). Even a monologue could contain such an enunciation; that is why the statement of a unit of meaning connects with the first epistemological perspective, egocentricity.

In perspective 2, creative thinking involves more than presenting to peers units that matters. Contextualizing the meaning or describing its context presupposes the invention of simple relationships in order to explain or to give significance to the meaning given (by oneself or by a peer). It requires a decentering of perspective; it agrees with the necessity to expose to peers a set of circumstances which describe that meaning. In this perspective, the pupils are not inclined to evaluate, compare or prioritize meanings. All the relationships and networks constructed by the pupils seem equally acceptable. Because, on one hand, of the decentering required, and on the other hand, of its *a priori* non-critical aspect, perspective 2 corresponds to epistemological relativism.

Evaluation of meaning (perspective 3) presupposes a previous interpretation of the meaning, which is generally carried out by establishing critical relationships between elements of the discourse. The capacity for evaluating meaning goes hand in hand with critical dialogue. It presupposes a search for greater significance or relevance; a capacity for evaluation and an awareness of the ephemeral quality of experience, as well as of the validity of inquiry. It therefore corresponds to inter-subjectivity oriented toward meaning.

Perspective 4 was not observed in the transcripts; the concept as presented in the grid is a simple theoretical extrapolation from the previous perspectives: if we pursue the increasing complexity of creative thinking, we could probably attain reflection upon the meanings themselves, in a tangible intent to improve or transform them. We could then be confronted with complex relationships, which would be linked to theoretical knowledge on the subject.

Responsible Thinking

The responsible thinking mode unfolds with regard to responses to others. At the beginning of the school year, we observed a response which relates to behaviour, rules or principles, and which was a basic statement (perspective 1).

Perspective 2 presupposes that there is a desire to know and understand others and the moral rules governing their conduct. What motivates the pupils' desire to know and understand is an interest, both in the people they rub shoulders with, and in the rules that make up the society to which they belong. They open up to the world's plurality, and their first movement is acceptance of these rules, since they reflect the work of adults and experts. Relativism is therefore present in this perspective.

Perspective 3 presupposes that pupils, after experiencing the functioning of people and society, want to become involved – not in a concrete manner through social actions (this would be perspective 4), but at least by taking a stand. In any case, at this point, they have enough practical knowledge to take an enlightened stand. In order to do this, they evaluate what they know about behaviours and moral rules by criticizing and questioning them. Thus, we are situated in inter-subjectivity of perspective. If critical reflection had not only concerned behaviours and rules, but had also based itself on the theories related to these elements, reflection would have been set beyond the search for meaning, attaining the next perspective.

Although certain groups definitely engaged in questioning of behaviours and moral rules, no group engaged in this subsequent step, which, in theory, is commitment to change, or to act in a more ethical manner (perspective 4). We consider that the lack of knowledge with regard to democracy, justice, values, and so on, prevented them from attaining this perspective.

Meta-cognitive Thinking

From the transcripts, we observed that the development of meta-cognitive thinking starts from a statement of the task, skill, strategy, point of view, etc. (perspective 1).

Perspective 2 is related to relativism to the extent that the pupil does not consider diversity of opinions as a problem to be solved, but rather as a reality to be expressed or understood; as such, a description, that is, an enumeration of viewpoints, tasks or strategies observed in order to provide a concrete grasp on the reality of the pupil's point of view, appears to be sufficient.

Perspective 3 reflects inter-subjectivity, in that the pupil going to the trouble of explaining the points of view, the tasks or the strategies observed must necessarily conceive that reality is not only complex, but also subject to evaluation.

Perspective 4 of meta-cognitive thinking stems from a theoretical exploration, since it was not directly observed in the transcripts.

Discussion and Conclusion

One of the objectives of this research project concerned the definition of dialogical critical thinking, and the manifestations of its development in pupils aged 10 to 12 years when engaged in philosophical-mathematical discussions.

Based on analysis of the 24 transcripts of exchanges among pupils issuing from three different cultural contexts, we arrived at the following definition of dialogical critical thinking: *The process of (e)valuating an object, in cooperation with peers, in an attempt to eliminate irrelevant criteria, and in order to contribute to improvement of experience. Dialogical critical thinking is a common inquiry process which manifests itself in complex attitudes and skills related to conceptualization, transformation, categorization and correction. It thus requires*

logical, creative, responsible and meta-cognitive thinking modes used in a complex epistemological perspective, that is, inter-subjectivity oriented toward meaning. As a result, a new understanding of the object is generated and a modification of the initial idea appears.

A descriptive grid, presented in two sections relating to thinking content and form, was produced based on the analysis of the transcripts. As a whole, the grid reflects the cognitive evolution of youngsters as they engage in weekly discussions among peers on philosophical-mathematical concepts. Perspective 1 (egocentricity) and perspective 2 (relativism) represent steps prior to attaining dialogical critical thinking. At perspective 3 (inter-subjectivity oriented toward meaning), we find the components inherent in dialogical critical thinking. These are only manifested when the exchange is of a critical dialogical type (vs. semi-critical or non-critical dialogue). Perspective 4 (inter-subjectivity oriented toward knowledge) was not directly observed in the groups of pupils involved in the project; the researchers inferred its occurrence. This probably represents the next perspective the pupils would attain if they pursued their philosophical discussion sessions; it illustrates thinking at its most complex level.

Dialogical critical thinking and inter-subjectivity do not appear spontaneously in pupils 10 to 12 years old. At this age, the pupils still have a reflex to largely accept the perspectives put forward by their peers. Doubt and critical evaluation require tenable attention and a real cognitive effort (Dewey, 1980) which pupils neglect when they are enjoying participating in a spontaneous dialogue.

When dialogical critical thinking occurs, it calls upon (generally at the same time) four cognitive modes: logical, creative, responsible and meta-cognitive. Logical thinking finds its most frequent manifestations in the conceptual discussion that stems from reasoning and spontaneous justification ("it is so because..."). Creative thinking is rooted in the quest for

meaning; it is displayed in the transformation of meaning, that is, in the expression of different and diverging points of view and in the questioning of accepted meanings. Responsible thinking is carried out as a response to others; it presupposes a capacity to categorize the particular acts into moral rules and ethical principles, and to evaluate them. Meta-cognitive thinking is manifested in an awareness of the viewpoints of others which has an impact on the correction of the group and the modification of the initial idea. Dialogical critical thinking therefore connects to inter-subjectivity (oriented toward meaning) in its content and in its form.

Inter-subjectivity presupposes that the pupils are aware of their tendency to support their judgments with irrational beliefs, and that their peers views are needed for them to surpass their own beliefs and conceptions; to increase the coherence, viability, solidity, etc. of their judgments; to construct the world and to construct themselves as unique persons and as members of a community (Rorty, 1991).

Thus, the development of dialogical critical thinking and, consequently, of inter-subjectivity, requires a well-sustained philosophical *praxis*, in terms of both frequency and time (Daniel, Lafortune, Pallascio, Schleifer, 2000). Of course *praxis* does not mean "practice" in the sense of training; it suggests rather the use of a pedagogical approach that will link critical thinking to improved personal, social and school experience (Freire, 1970), or, in other words, an approach that will permeate the pupil's schooling period transversely (Dewey, 1916/1983). Because of its emphasis on the cooperative aspect, dialogical critical thinking requires a minimum of significant personal experience (Dewey, 1908/1980; Sharp, 1992), social awareness (Doise & Mugny, 1984; Garnier, Bednarz, Ulanovskaya, 1991) and peer concern (Gregory, 1997; Lipman, 1991; Sharp, 1990).

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